MODEL-BASED GRAYSCALE REGISTRATION OF MEDICAL IMAGES

ABSTRACT OF THE DISCLOSURE

Numerical image processing of two or more medical images to provide grayscale registration thereof is described, the numerical image processing algorithms being based at least in part on a model of medical image acquisition. The grayscale registered temporal images may then be displayed for visual comparison by a clinician and/or further processed by a computer-aided diagnosis (CAD) system for detection of medical abnormalities therein. A parametric method includes spatially registering two images and performing gray scale registration of the images. A parametric transform model, e.g., analog to analog, digital to digital, analog to digital, or digital to analog model, is selected based on the image acquisition method(s) of the images, i.e., digital or analog/film. Gray scale registration involves generating a joint pixel value histogram from the two images, statistically fitting parameters of the transform model to the joint histogram, generating a lookup table, and using the lookup table to transform and register pixel values of one image to the pixel values of the other image. The models take into account the most relevant image acquisition parameters that influence pixel value differences between images, e.g., tissue compression, incident radiation intensity, exposure time, film and digitizer characteristic curves for analog image, and digital detector response for digital image. The method facilitates temporal comparisons of medical images such as mammograms and/or comparisons of analog with digital images.